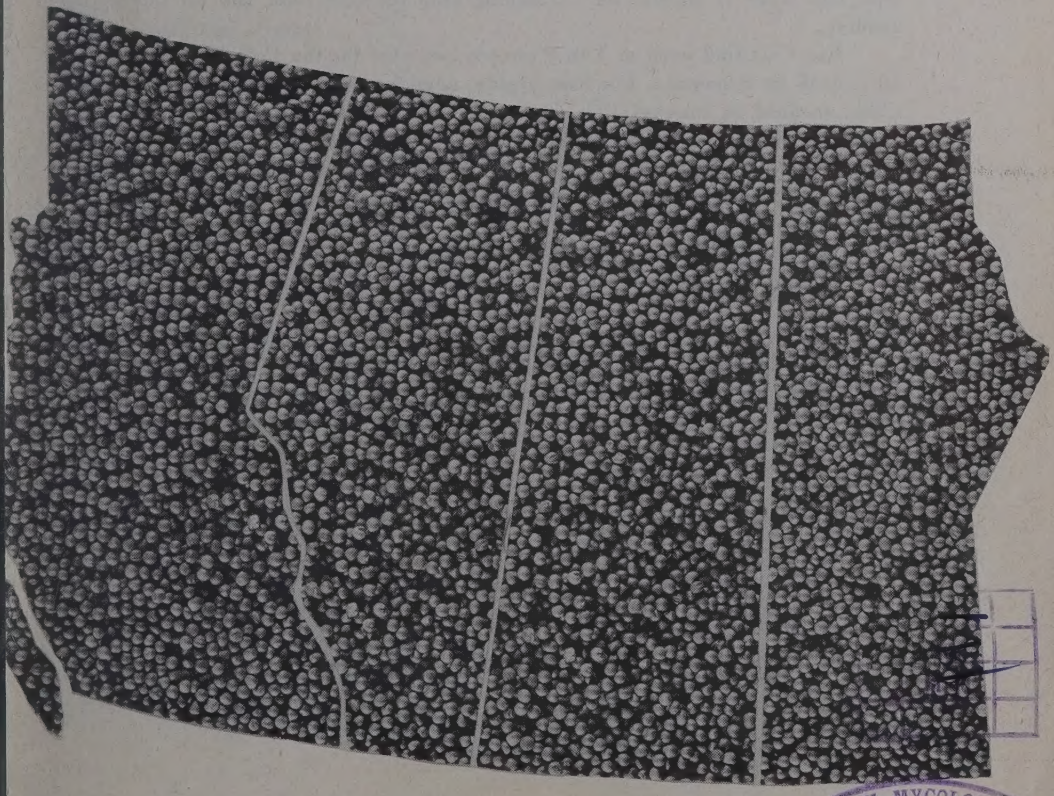
PRODUCTION OF Rape IN WESTERN CANADA



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A NEW CROP FOR WESTERN CANADA

Rapeseed is a relatively new oil crop in Canada. The oil is used in margarine, shortening, and other edible products and also as a lubricant. The oil-meal is used as a protein supplement for livestock.

Rape is a cool-season crop best adapted in the moist areas of the Prairie Provinces. Two types of rape are grown. Arlo is the recommended variety of the Polish type and Golden of the Argentine type. The early maturity of the Polish type has made it popular as a cleaning crop for wild oats and for late-spring seeding.

Use Certified seed at 4 to 6 pounds per acre for the Polish type, and 7 to 10 pounds for Argentine. For best yields, seed from May 10 to May 31. Sow into a firm seedbed on summerfallow. Do not seed on or next rape stubble.

Examine rape fields frequently for signs of injurious insects from emergence to maturity. Cutworms, the bertha armyworm, the red turnip beetle, flea beetles, the beet webworm, and diamondback moth larvae may attack rape. Prompt control of these insects is essential.

Diseases have not been serious except when rape is grown on rape stubble.

Certain chemicals control wild oats in rape. No other herbicides can be used.

Swath rape when most of the seed has begun to turn brownish. Combine it as soon as the seed is dry. There is danger of heating when rapeseed is stored at above 10.5 per cent moisture. It is possible to straight-combine Polish type rape because it matures early and resists shattering more than the Argentine type.

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PRODUCTION OF RAPE IN WESTERN CANADA

R. K. Downey[1] and J. L. Bolton[2]

Research Station, Saskatoon, Sask.

HISTORY OF RAPESEED PRODUCTION IN CANADA

Rapeseed was first grown commercially in Canada in 1942. In that year, seed of Black Argentine rape[3] was imported from Argentina and distributed to farmers. This was a war measure, because rapeseed oil was used to lubricate marine engines. From 1942 to 1948, the Canadian Wheat Board set the price of the seed at 6 cents per pound and production rose to 80,000 acres. This acreage declined rapidly when price supports were discontinued, and until private industry established markets abroad.

The acreage, price, and yield of seed in Canada from 1942 to 1960 are shown in Table 1. About 90 per cent of the crop is exported as seed. The price received by the farmer is based mainly on the world price for the seed. However, since other vegetable oils may be substituted for rapeseed in many products, it also depends upon prices for soybean, cotton, sunflower, and similar oils.

USES OF RAPESEED

Oil

Under average growing conditions, 40 per cent by weight of the seed is oil. For example, one bushel (52 pounds) yields over 20 pounds of oil. Most of the oil is used to produce edible products such as margarine, shortenings, and salad and cooking oils. Although the oil has been used in these products for thousands of years in Europe and Asia, Canadian processors have used it only recently as an edible oil. This use has resulted in a rapid increase in domestic consumption. It is estimated that 250,000 acres of rape will be needed to supply the domestic market within a few years.

There are also industrial uses for rapeseed oil, although at present they do not represent a major outlet. The oil is an excellent lubricant for marine engines and certain delicate mechanisms. In recent years, some of the oil fractions have been used in jet engine lubrication and in the manufacture of plastic sheeting. There is also a possibility of using rapeseed oil as an additive to motor oils. A general-purpose grease in which rapeseed oil replaces castor oil is already on the market.

Meal

Rapeseed oilmeal remains after the oil has been extracted from the seed. It is an important by-product that is used extensively as a protein supplement

[1] Research Officer in charge of rape breeding.

[2] Head, Forage Crops Section.

[3] *Brassica napus* L.

Table 1.– Acreage, yield, and value of rapeseed grown in Canada, 1945–60

Year	Acreage	Yield per acre Lb.	Production Lb. 000's	Price per lb.[1] $	Value $1,000
1945	20,400	529	10,000	.060	651
1946	23,700	549	13,000	.060	780
1947	58,300	375	21,862	.060	1,312
1948	80,000	800	64,000	.060	3,840
1949	20,000	850	17,000	.050	850
1950	1,400	300	420	.038	16
1951	7,500	950	7,125	.035	246
1952	18,500	859	15,900	.034	547
1953	29,500	877	25,875	.036	923
1954	40,000	722	28,900	.034	975
1955	136,200	568	77,400	.035	1,975
1956	357,000	855	305,000	.030	9,150
1957	618,000	701	433,000	.035	15,155
1958	626,000	620	388,100	.025	9,703
1959	213,500	834	178,000	.041	7,298
1960	756,000	729	551,000	-- [2]	

[1] Average farm price for all grades and qualities.
[2] Estimated at .035 or more.

for livestock and poultry. As marketed, the meal contains about 37 per cent protein and 60 to 70 per cent total digestible nutrients.

Honey

Rape is an excellent honey plant and honey bees visit it freely for both pollen and nectar. If the bee colonies are strong, the early-flowering Polish type extends the honey flow considerably. Rape honey is of good quality although it is slightly inferior to clover honey in color and flavor. It tends to granulate in the comb and should be extracted before the end of August. This tendency makes it unsatisfactory for overwintering bees. The honey blends well when granulated or creamed, although it is not preferred for liquid packs.

AREA OF ADAPTATION

Rape is a cool-season crop. It is not as drought-tolerant as the cereals and is best adapted to the northern districts of the Prairie Provinces. Seed yields of 3,000 pounds per acre are on record, but 1,200 to 1,500 pounds per acre with oil contents of 42 to 46 per cent are common under good growing conditions. Rape does well on light or heavy soils if rainfall and fertility are adequate.

Table 2.– Characteristics of the types of rape grown in Western Canada

Characteristic	Argentine type *(Brassica napus)*	Polish type *(B. campestris)*
Days to mature	About the same as wheat	Two to three weeks earlier than wheat
Height	2½ to 4 feet	1½ to 3 feet
Shattering	Shatters readily when ripe	More resistant to shattering
Frost damage	Susceptible to late-spring and early-fall frosts	More resistant to early-spring frost and usually matures before fall frosts
Tolerance to drought	Susceptible in late summer	Often matures early enough to escape drought
Seed yield	High under moist, frost-free conditions	Equal to or better than Argentine under frost or drought; otherwise about 25 per cent less
Seed size and color	Large, very dark brown to black when mature	Small (half as large as Argentine). Reddish brown to black when mature
Oil content	40 to 46 per cent	40 to 44 per cent
Pollination	About 70 per cent self-pollinated	Almost completely cross-pollinated
Licensed variety	Golden	Arlo

In the southern districts of the Black Soil zone in western Alberta, southwestern Saskatchewan, and southern Manitoba, rape generally yields 10 to 15 per cent less seed than in northern districts. A further reduction of 10 to 15 per cent can be expected in the Brown and Dark Brown zones. In these two zones, rape should be sown on clay and clay-loam soils rather than on the more droughty sand and sandy loams.

Rape seedlings survive late-spring frosts, but heavy frosts may cause severe damage. The Polish type is more resistant in the seedling stage than Argentine and may also be seeded late enough to escape frost damage.

Frosts in the fall may cause losses if the seed is immature. Not only is the yield reduced, but immature and frosted samples are degraded by the seed trade. Again, the early maturity of the Polish type is a distinct advantage.

RAPE SPECIES

Two species of rape are grown as oilseed crops. The species *Brassica campestris* L. is the type most commonly grown in Western Canada. It was introduced from Poland and is known as the Polish type. The common name in European countries for this species is turnip or bird rape. The species *Brassica napus* L., introduced from Argentina in 1942, is called the Argentine type in Canada. In Europe it is known as rape or Swede rape. At present *B. napus* is grown on about 20 per cent of the acreage seeded to rape in the Prairie Provinces.

In both species there are fall, or winter, varieties. These produce a rosette of leaves in the fall of the first year and mature seed early the next summer. Although these varieties are the main ones grown in Europe, none of them survives the prairie winters. One winter variety, Dwarf Essex rape, is known to Western Farmers. It is grown as late-summer and fall pasture for hogs and sheep, but does not live through the winter.

Table 2 outlines the principal differences between the Argentine and Polish types.

VARIETIES OF RAPE

Argentine Type

Golden.– This variety was developed in the Forage Crops Section at Saskatoon, by selection from the original introduction of Argentine. It yields 2 to 4 per cent more oil than any other variety and slightly more seed. Registered and Certified seed are available.

Argentine.– This is generally used as a variety name but properly refers only to the original, unselected introduction. No pedigreed seed is available and the basic stock has been replaced or mixed with Golden or imported European varieties.

Swedish.– There is no pedigreed variety Swedish. The name has been applied to commercial and farmer introductions from Sweden. All tests in Western Canada indicate that the material offered as Swedish is the variety Regina II.

Regina II.– This variety was released by the Swedish Seed Association, Svalof, Sweden, but is not licensed for sale in Canada. It is similar to Golden in appearance but yields less seed and oil.

Polish Type

Arlo.– This variety was released by the Swedish Seed Association, Svalof, Sweden, and licensed for sale in Canada in 1958. It is the recommended variety of the Polish type and yields slightly more oil than unselected Polish. Certified seed is available.

Polish.– This name properly refers to the original, unselected introduction. There is no pedigreed seed stock since it is not licensed as a variety in Canada. It is similar to Arlo in appearance and in yield of seed.

CULTURAL PRACTICES

Choice of Variety

In areas with a short frost-free period, where drought is a hazard, or where seeding is delayed until the end of May or early June, the Polish type is recommended. In other areas, Golden is better because of the potentially higher yield of seed and oil.

Choice of Seed

Rape seed usually germinates well unless the crop was exposed to heavy fall frost or was harvested after standing out over winter. Where damage to the seed is suspected, have the germination tested.

See that the seed is as free from mustard as possible. To be sure, use Certified seed. Obviously the use of seed high in mustard may pollute the land with this weed. Furthermore, contamination with mustard lowers the grade of the rape seed offered for sale for crushing in Canada or for export.

Choice of Land and Crop Rotation

Rape is a summerfallow crop. When seeded on summerfallow, it is likely to yield three to four times as much seed as when seeded on cereal stubble.

Never seed it on rape stubble. The seedlings may be seriously damaged by insects, diseases, and drought because of the previous crop of rape. For the same reasons, do not grow rape after sunflowers or sweet clover.

Since rape and wild mustard are closely related, no chemical is known that will destroy the mustard without killing the rape. Therefore, the land should be as free of wild mustard as possible.

Some of the seed is nearly always shattered in the field. Therefore, rape is almost certain to volunteer in any crop sown the following year. To control the volunteer rape, grow a crop that can be sprayed with 2,4-D or MCP. Wheat or barley is best. Flax and oats are reasonably suitable, but both are more likely to be damaged by the herbicide.

Experiments have shown that where wheat follows rape the yield is about the same as that of wheat after wheat or of wheat after flax.

Preparing the Land

Provide a firm seedbed and protection against wind erosion. The firm seedbed is necessary to permit shallow seeding. The seedlings develop rather slowly and do not hold the soil as well as grain crops. The small plants are also easily destroyed by drifting soil. It is thus important to leave the land in a condition that will minimize the danger of soil drifting.

Time of Seeding

Avoid early seeding because frost may damage the seedlings. The Argentine type may be sown from about May 10 to the end of May, the Polish type from about May 10 to June 10. The later dates of seeding usually give less seed.

Rate of Seeding

The rate of seeding varies with the variety. For varieties of the Polish type, such as Arlo, 4 to 6 pounds per acre is enough. For Golden and other varieties of the Argentine type, sow 7 to 10 pounds per acre.

Rate of seeding affects the yield very little. In thin stands, the plants branch more than in thick stands and this compensates for the fewer plants.

Methods of Seeding

Because the seed is small, it should not be sown deeper than 1 to 1½ inches. It is usually sown in drills 6 or 7 inches apart.

The grain drill is the most satisfactory implement for seeding since it gives better control of depth than the disker or the tiller-combine. If a disker is used, take extra care to prevent seeding too deep. Generally, the tiller-combine is not suitable for seeding because it does not seed shallow enough.

Because the seed is small, round, and heavy, the chief problem is to control the rate of seeding. Some of the newer drills can be adjusted to the desired rate. With older drills, it is usually necessary to mix other material with the rapeseed, such as:

(a) Coarsely ground grain (from which the finer particles have been screened) at the rate of about 1 pound of cracked grain to each pound of rape.

(b) Fertilizer (the mixture being sown from the fertilizer attachment of the drill). Mix the seed and fertilizer just before seeding. Do not leave the mixture standing for even a few days for germination may be reduced. To seed 20 pounds of fertilizer and 10 pounds of rape per acre, mix them in this proportion and set the fertilizer attachment to sow 30 pounds of fertilizer.

In areas of high rainfall, another method is to broadcast the seed and then harrow or disk lightly.

Use of Fertilizer

Tests with fertilizers indicate that phosphate increases yields. Forty pounds per acre of 11-48-0 is recommended on summerfallow.

POLLINATION

Varieties of the Polish type, such as Arlo, are almost completely cross-pollinated. Wind can carry the pollen from one plant to another, but insects, principally bees, are also important.

Preliminary experiments show that the yield of seed of the Polish type in fields stocked with honey bees is at least 30 per cent higher than in fields pollinated by wind only. If there are enough bees, the flowering period is shorter and the rape ripens earlier and more uniformly. One colony of honey bees per acre is suggested for adequate pollination. However, if there are fields of other rape and sweet clover and other legume crops nearby, the number of colonies per acre should be increased.

INSECT PESTS

Insects may damage rape severely and you should be prepared to identify and control them. Examine your fields often for the first signs of insects from the time the rape emerges until the pods are fully formed.

A separate sprayer should be used to apply insecticide on rape. If it is necessary to use a weed sprayer, wash it thoroughly to remove all traces of the herbicide. The salts of 2,4-D or MCPA may be removed by thorough rinsing with a solution of detergent. Run the pump with the valve to the boom shut off until the detergent is mixed. Open the valve and spray the mixture on a bare area for 5 minutes. Shut off the valve and pump and allow the sprayer to stand overnight. Drain the sprayer and rinse it thoroughly.

The esters of 2,4-D, MCPA, and 2,4,5-T are soluble in oil but not in water. Use a wash mixture of 95 gallons of water, 5 gallons of fuel or diesel oil, and a detergent. Use this mixture in the same way as for the salts.

The following insects are the ones most likely to cause trouble in Western Canada.

Red-backed Cutworm[4]

Cutworms cut off the rape seedlings at or just below the soil surface. When abundant, they damage rape more severely than cereal crops. Damage may show up anytime from late May to mid-June, and continue until the end of June or early July.

Control these insects promptly to avoid serious damage. Spray with an emulsible concentrate of one of the following: aldrin at 1 quart of 20 per cent concentrate, chlordane at 3 pints of 40 per cent concentrate, dieldrin at 1 pint of 20 per cent concentrate, endrin at 1 pint of 20 per cent concentrate, or heptachlor at 1 quart of 20 per cent concentrate per acre. Use a low-pressure, low-volume boom sprayer and apply with 6 or 7 gallons of water per acre.

Bertha Armyworm[5]

The moth of the bertha armyworm lays eggs on the rape plants in early July. The young caterpillars are light green and are seen only on very careful examination. Towards the end of July or the first part of August, they change markedly in appearance. From then to maturity, they are a conspicuous velvety

[4] *Euxoa ochrogaster* (Guen.).
[5] *Mamestra configurata* Wlk.

black, with a yellowish band along each side. They are about 1½ inches long when full-grown.

The young caterpillars feed on the leaves but the damage at this stage is seldom noticeable. When they are about three-quarters grown they start feeding on the seed pods and may cause heavy losses in yield in a short time. They chew into the rape pods and sometimes cut the stems so that the pods fall to the ground. Damage varies to some extent with stage of maturity and the year but, generally speaking, 10 or more caterpillars per square yard require treatment.

For control, spray with DDT at 1 quart of 25 per cent emulsible concentrate per acre.

Red Turnip Beetle[6]

This beetle has red and black stripes and is about 3/8 inch long. It eats the leaves in the latter part of June and the pods in August. It rarely causes damage unless rape is seeded on rape stubble or next a field where rape was grown the year before.

For control, use DDT as recommended for the bertha armyworm.

Flea Beetles[7]

These beetles are shiny, black, quick-jumping, and about 1/12 inch long. They eat small, round holes in the leaves, and produce what is often called a "shot-hole" effect. If enough leaf tissue is eaten, the leaves turn brown and drop off. The beetles may damage rape seedlings from the time they emerge until the end of June. Occasionally they appear again in August and feed on the pods.

For control, use DDT as recommended for the bertha armyworm.

Beet Webworm[8]

This webworm is a slender, active caterpillar. It is dark green, with a black line and two rows of black circles along the back, and is about 1 inch long when fully grown. Outbreaks occur in late July or August. The webworms eat the leaves quickly and may chew into the seed pods or strip the surface tissue from the pods and stems, giving the crop a whitish appearance.

For control, spray with Dylox at 1 pound of 50 per cent soluble powder per acre in water.

Diamondback Moth[9]

There are several generations of the diamondback moth during a season. Usually by mid-July all stages, eggs, caterpillars, pupae, and moths, are present at the same time.

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[6] *Entomoscelis americana* Brown.
[7] *Phyllotreta* spp.
[8] *Loxostege sticticalis* (L.).
[9] *Plutella maculipennis* (Curt.).

The eggs are very tiny and are difficult to see with the naked eye. The caterpillars are nearly colorless at first, but later are yellow-green. They are ½ inch long when full-grown, and spindle-shaped (widest at the center and tapering toward both ends). When disturbed they usually wriggle backwards off the leaf.

The cocoons, containing the pupae, are often the first thing noticed in infested fields. These cocoons are delicate, open-meshed silken structures, attached to leaves, stems, or pods.

The adults are small, slender, grayish-brown moths, only about ¼ inch long. They rest during the daytime and are usually seen only after dusk, flying above the rape plants.

Rape is damaged by the caterpillars, which feed from the lower surfaces of the leaves and eat all the tissue except the veins and the upper surfaces. When abundant they also eat the flowers and young pods of rape, chew holes in the older pods, and chew the green outer layers from the stem and pods.

For control, spray with Dylox in water at 2 pounds of 50 per cent soluble powder per acre.

Wireworms

Wireworms seldom damage rape, and control measures are rarely needed.

Cautions

Follow closely all the cautions given on the insecticide label. Be careful not to contaminate nearby pastures and haylands, especially when applying persistent insecticides such as DDT and those recommended for the red-backed cutworm.

If honey bees are foraging in the area, take suitable precautions not to kill them. Notify the beekeepers so that they may remove or confine the bees if possible. Apply insecticides to fields in bloom only when the bees are not visiting the plants if this is feasible.

If in doubt as to the insect causing damage or the proper control measures, consult your local district agriculturist or agricultural representative. This is particularly important when the bertha armyworm, the beet webworm or the diamondback moth must be controlled. The recommendations for control of these pests on rape are changing each year as more information becomes available on effectiveness, cost per acre, and possible residue problems of various insecticides.

DISEASES

Diseases have not been important in the production of rape except when rape is seeded on or next to rape stubble. However, if the present acreage of rape is maintained or increased, they may become a serious problem.

Sclerotinia Stem Blight

This blight causes bleaching and sometimes premature death of plants. Affected plants pull easily, and the stems are pale and tend to shred. When slit

Figure 1.— Sclerotinia stem blight. Note the light color and shredding of the base of the stem and the fungus bodies inside.

open the stems are found to contain black, hard, oval bodies (sclerotia) of the fungus[10] near the base (Figure 1). These bodies fall to the ground or get mixed with the seed during threshing, and carry the fungus over winter. This disease occurs in sweet clover, sunflowers, and several weeds of the mustard and thistle families. Rotation with cereal crops, including a fallow year, and control of weeds reduce infection.

White Rust-Downy Mildew

This disease is troublesome in moist northern areas and is a complex caused by two fungi[11] that distort the flowering parts. These become swollen, abnormal, often spiny structures (Figure 2). At first, if conditions are moist, white powdery masses (spores) may develop on the surfaces of these structures; later the white masses turn brown and resistant spores are formed inside. Fragments

[10] *Sclerotinia sclerotiorum* (Lib.) de Bary.
[11] *Albugo cruciferarum* S.F. Gray and *Peronospora parasitica* (Pers. ex Fr.) Fr.

are broken off at harvest, fall to the ground or get mixed with seed, and carry the fungi over winter.

To reduce infection, use clean seed, and do not grow rape after rape or next a field sown to rape the previous year. Do not grow rape on land infested with mustard or thistles.

Figure 2.– Distorted seed heads caused by the white rust – downy mildew disease complex.

Stem and Leaf Spots

Two leaf-spotting diseases affect the leaves and other above-ground parts of rape. The fungus *Alternaria brassicae* causes black spots chiefly on the stems and pods and may discolor and shrivel the seed. This fungus is seed-borne.

The fungus *Mycosphaerella brassicicola* causes gray-speckled rings or blotches on the leaves and blackening of the stems. This disease, known as ring spot or black blight, has been reported in the parkbelt of Saskatchewan. This fungus is also seed-borne.

To reduce infection by these diseases, practice crop rotation and treat seed from infected fields.

Root Rot

This disease, caused by *Fusarium* species, may be recognized by a pale, hard lesion at the base of the stem. The edges of the lesion are clearly defined.

Aster Yellows

This is a virus disease spread by some species of leafhoppers. It causes the seed pods to become distorted and to set no seed (Figure 3). Many affected plants continue flowering after unaffected plants have finished. The prevalence of the disease depends largely upon the abundance of the leafhoppers that are carrying the virus.

Seed Treatment

It helps little if at all to treat seed of high germination, such as 90 per cent or higher, unless it comes from fields infected with stem and leaf diseases. If the germination is 80 per cent or lower and the seed must be used, treat it with captan or an organic mercurial such as Ceresan M or Agrox C at 1 ounce per 50 pounds of seed.

WEED CONTROL

Rape is highly susceptible to 2,4-D and similar herbicides that are often used to control broad-leaved weeds. Therefore, spray drift from nearby fields, roadsides, and power-line rights of way may cause serious damage (Figure 4).

Although a good stand of rape crowds out most weeds, it does not check wild oats. To control this weed, cultivate the land until late May or early June and then seed the Polish type of rape. However, this delayed seeding generally reduces seed yield somewhat.

Certain herbicides are effective against wild oats in rape. The following treatments are recommended by the Western Section of the National Weed Committee for 1961, but may change with further testing. Consult your district agriculturist or agricultural representative for the latest information.

To remove all traces of other herbicides from the sprayer, see the section on insect pests (page).

IPC

Apply this chemical at 4 to 5 pounds of the active ingredient per acre in 5 to 10 gallons of water before planting and disk it in. At present IPC is recommended in Manitoba, but has not been effective in the drier parts of Saskatchewan and Alberta.

Figure 3.— Left, rape plant infected with aster yellows. Right, normal plant. Note bladderlike distortion of pods on infected plant.

Figure 4.– Damage to Golden rape by 2,4-D drift. Plants next the sprayed barley are stunted or dead; those farther away are in full bloom.

Avadex

Apply this at 1½ to 2 pounds of the active ingredient per acre in 5 gallons or more of water at a pressure of 30 pounds per square inch. On the same day, disk it into the soil to a depth of not more than 3 inches. You may sow the crop at once or as soon as convenient. Use the higher rate on fine-textured soils such as clay or when the wild oat infestation is heavy.

Barban (Carbyne)

Apply this at 5 to 7 ounces of the active ingredient per acre in 5 gallons of water, when most of the wild oats are in the two-leaf stage. The effect of the chemical is gradual and may not be seen until two to three weeks after spraying. The degree of control depends on the uniformity of emergence of the wild oats. Use the higher rate for the thinner stands of rape.

HARVESTING AND THRESHING

It is important to allow the seed to become nearly ripe before cutting. When too green the seed shrivels and the oil content is below that of mature seed. The seed should be dry when threshed. When the moisture content is above 10.5 per cent there is danger of heating.

Signs of Maturity

As rape matures the leaves are shed. The stem and pods turn a straw color when the seed is ripe. The seed gradually darkens in color as it ripens. When fully mature and dry the pods are brittle and shatter fairly readily. As the crop approaches maturity it ripens rather rapidly and should be checked fairly frequently.

Straight Combining versus Swathing

Most farmers prefer to swath the Argentine type of rape. Swathing reduces shattering and may prevent or reduce frost damage to late crops or late spots in fields. Because the Polish type matures earlier than the Argentine type the Polish type is often straight-combined. It may also be swathed.

Swathing

Swath the crop just before it is fully mature, when most of the seed has begun to turn brownish. The seed will darken while in swath.

In swathing, the reels may cause shattering. To reduce this loss, cut the speed of the reel to about half or two thirds the usual speed. It also helps to remove half of the bats on the reel. In a very heavy stand, the crop may be cut satisfactorily without a reel.

The swath tends to be fluffy and may be scattered by a strong wind. If you cut fairly high and on the green side, the swath tends to settle into the stubble and to be anchored by it, and less material is taken up by both the swather and the combine. If the stubble is too high, undue shattering may occur in picking the swath up.

Combining

In straight combining, the reel may cause shattering. The precautions noted above for swathing help to reduce this loss.

At cylinder speeds used for wheat, oats, or barley, much of the seed may be cracked or chipped. Therefore, reduce the cylinder speed to about half that used for the grain crops. Operate other parts of the combine at normal speeds. Have the concave adjustment so that the stems and pods are broken as little as possible. Keep the fan speed rather low.

Combine the swath as soon as the seed is dry. This reduces the risk of damage by wind.

Cutting with a Binder and Threshing

This is the least desirable method of handling the crop. The crop has to be cut when very green to keep the elevator canvasses and packers from shattering

a great deal of seed. The sheaves are bulky and much seed is lost in handling them, particularly if the loads are packed. In addition, considerable twine is needed to tie the crop.

STORAGE AND CLEANING

The seed of rape is round, small, and heavy and runs freely. For bulk storage the bin must be tight. If you do not have tight bins, bag the seed.

If the seed is tough or damp, place it in shallow layers and check it frequently for heating. If necessary, turn the seed over in the bin.

The seed can be cleaned fairly well with a fanning mill. A round-hole zinc sieve with holes about 7/64 inch in diameter passes most of the dockage over the top of the sieve. A bottom screen, size 4 × 22, removes most of the smaller weed seeds.

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Some brand names are used in this publication because the chemical names are difficult for general use and there are no official common names for the active ingredients.

Copies of this publication may be obtained from:

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